

### **DETAILED ACTION**

This Office Action is in response to the Applicant's Amendment After Final filed March 15th, 2010. In virtue of this communication claims 1-4, & 6-50 are currently presented in the instant application.

#### ***Allowable Subject Matter***

1. Claims 1-4 & 6-50 are allowed.
2. The following is an examiner's statement of reasons for allowance:
  - a. With respect to claim 1 the prior art Boyle et al. (U.S. Patent No. 6,586,707; hereinafter referred to as Boyle) discloses: a method, using a pulsed laser (see column 2, line 17), of program-controlled (see column 5, line 14,15) dicing of a substrate (see column 5, line 48-49), the method comprising the steps of:
    - a. providing a programmable laser controller and an associated memory (see column 5, line 14,15; a processor uses a computer program and as such the control system and the data system use a computer program) for controlling a pulsed laser that generates a laser beam propagating through a telecentric scan lens for scanning the laser beam across a substrate having at least one layer (see column 1, line 59,60);
    - b. providing in the associated memory a laser cutting strategy file (see column 5, line 46-51 (referred to as the machining strategy; machining strategy understood as being a program file input into the control system for the control of laser machining) of a plurality of combinations of pulse rate, pulse energy and pulse

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spatial overlap (see column 2, line 38-40 (referred to as scan velocity, laser power, and pulse overlap respectively) and column 7, line 43-50) of pulses produced by the pulsed laser at the substrate to restrict damage to the at least one layer while maximising machining rate for the at least one layer (see column 5, line 41-51);

c. providing in the laser cutting strategy file data representative a selected plurality of scans of the at least one layer by the pulsed laser necessary to cut through the at least one layer when the pulsed laser is operating according to selected combination of pulse rate, pulse energy, and pulse spatial overlap of pulses stored in the laser cutting strategy file (see column 2, line 48-49, column 5, line 45-58 and column 6, line 14-24 and Fig. 5); and

d. using the pulsed laser under control of the programmable laser controller driven by the laser cutting strategy file (see column 5, line 14,15) to scan the at least one layer with the selected plurality of scans (see column 3, line 19-20 and Figs. 1 & 5) at least to facilitate dicing of the substrate (see column 2, line 48-49) such that a resultant die has at least a predetermined die strength (see column 5, line 44 (it is understood that this implicitly discloses predetermined die strength)) and a yield of operational die equals at least a predetermined minimum yield (see column 1, line 15 and column 1, line 48,49 (it is understood that this implicitly discloses predetermined minimum yield)).

b. Boyle does not disclose the providing of a laser cutting strategy file comprising the steps of, mapping a laser energy density received in a focal plane

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of the telecentric scan lens to produce a laser energy density map of a field of view of the telecentric scan lens using the selected combination; storing the laser energy density map as an array in the memory; and using the laser energy density map to modify, with the programmable laser controller, at least one of the pulse repetition rate and the pulse energy of the selected combination to produce a constant laser energy density at scanned points in the field of view at the substrate.

c. None of the prior art on record contains such a limitation, nor given the prior art on record is it obvious to one ordinarily skilled in the art to add such limitations as recited in claim 1. Therefore, claim 1 is allowed as being not anticipated by or obvious over the prior art on record. As such claims 2-4, & 6-32 are also allowed as depending from an allowed base claim.

d. With respect to claim 33 the prior art Boyle et al. (U.S. Patent No. 6,586,707; hereinafter referred to as Boyle) discloses a program-controlled (see column 5, line 14-15) substrate dicing apparatus arranged to dice a substrate (see column 2, line 48-49) comprising at least one layer (see Fig. 1; it is implicitly understood that the wafer has at least one layer), the apparatus comprising: a pulsed laser (see column 2, line 17); a programmable laser controller and an associated memory (see column 5, line 14-15) for controlling the pulsed laser (see column 2, line 59-60) using a laser cutting strategy file (see column 5, line 48-49; referred to as the machining strategy), stored in the memory (see column

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5, line 14-15), of a plurality of respective combinations of pulse rate, pulse energy and pulse spatial overlap of pulses produced by the pulsed laser at the substrate (see column 2, line 38-39; referred to as scan velocity, laser power, and pulse overlap respectively) and data representative of a selected plurality of scans of the at least one layer by the pulsed laser necessary to cut through the at least one layer (see column 5, line 46-58); a telecentric scan lens for scanning a laser beam from the pulsed laser across the substrate (see column 4, line 64-66).

e. Boyle does not disclose a laser power meter for mapping a laser energy density received in a focal plane of the telecentric scan lens to produce a laser energy density map of a field of view of the telecentric scan lens using a selected combination of pulse rate, pulse energy and pulse spatial overlap of pulses, the laser energy density map being stored as an array in the memory for modifying at least the selected combination to compensate for irregularities, introduced by the telecentric scan lens, of laser energy density at the substrate, such that in use a resultant die has at least a predetermined die strength and a yield of operational die equals at least a predetermined minimum yield.

f. None of the prior art on record contains such a limitation, nor given the prior art on record is it obvious to one ordinarily skilled in the art to add such limitations as recited in claim 1. Therefore, claim 33 is allowed as being not anticipated by or obvious over the prior art on record. As such claims 34-50 are also allowed as depending from an allowed base claim.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JORDAN KLEIN whose telephone number is (571)270-7544. The examiner can normally be reached on Monday - Friday 9:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SUE PURVIS can be reached on (571)-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JMK/

4/7/2010

/Leonardo Andújar/

Primary Examiner, Art Unit 2826